homotopy property of Euclidean 3-space. Subsequently, Cesari showed how to avoid the use of this theorem by ingenious analytic devices. Both of these alternative approaches are treated fully in the book. One finds here also the first exposition in book form of the fundamental *Cesari representation theorem*, which states that every surface (this term being taken in the appropriate precise meaning explained in the book) of finite Lebesgue area admits of a conformal representation (in a certain generalized sense) such that in terms of this representation the Lebesgue area is given by the classical integral formula. An important feature of the book is the generality of the mappings which occur as representations of surfaces. Indeed, Cesari operates with mappings from plane sets of a general type which include open sets and finitely connected Jordan regions. From the point of view of general methodology, the following feature of the book is of special interest. Cesari notes that several of the fundamental theorems of the theory are concerned with a given individual representation of the surface, and he suggests that in such cases the proofs should be made in terms of the given representation, without using the existence of more favorable representations for the same surface. In carrying out this program throughout the book, he devises novel and most instructive proofs for several fundamental theorems and develops remarkable new methods. This feature of the book should give much food for thought even to the most seasoned specialist in the field. To the reader interested in applications, the Appendix on the Weierstrass-type integral developed by Cesari should be especially valuable.

The presentation is careful, precise, and concise throughout. Both for reference and for study, the book is an invaluable addition to the literature on surface area theory.

T. Rado

Additive Zahlentheorie. Part I. *Allgemeine Untersuchungen.* By Hans-Heinrich Ostmann. (Ergebnisse der Mathematik und ihrer Grenzgebiete, New series, no. 7.) Berlin, Springer, 1956. 7+233 pp. 29.80 DM.

The author has chosen to present additive number theory from the point of view of the theory of density of sets of integers. The largest part of this volume is devoted to the development of this theory and closely related topics, but certain other parts of additive number theory are included.

The basic concepts are the system Σ of sets $\mathfrak{A}$ of non-negative integers and the operation $\mathfrak{A}+\mathfrak{B}=\{a+b; a\in\mathfrak{A}, b\in\mathfrak{B}\}$. Their properties are developed in a natural way and some connections with other parts of number theory are pointed out.

Various types of density are defined and compared, and an extensive theory is developed. In the course of this study, other concepts and methods are introduced, and thus the contacts with other parts of number theory are increased.

One chapter, concerned with the partition function, is practically independent of the rest. It is essentially a survey of this subject. A few theorems are proved and a large number of results are stated without proof but with adequate references.

Throughout the volume, proofs are given with a minimum of details and, in some cases, are omitted.

H. S. ZUCKERMAN

Algebraic threefolds. By L. Roth. (Ergebnisse der Mathematik und ihrer Grenzgebiete, New series, no. 6.) Berlin, Springer, 1956. 8+142 pp. 19.80 DM.

The contents of this book can be divided into three parts and an appendix (plus a good bibliography); the first part, consisting of the first three chapters, contains a very compressed outline of such topics as the genera of algebraic varieties, Severi's systems of (rational) equivalence, results of the Riemann-Roch type for 3-dimensional varieties, and the theory of the base. All this is given without proofs, or with sketches of proofs of the classical type (that is, over the field of complex numbers, and without refraining from the use of imperfectly defined concepts).

The second part, consisting of Chapters 4 and 5, is devoted to the main topic of the book, namely several criteria of rationality or unirationality for surfaces and 3-dimensional varieties; proofs are usually supplied here. The third part (Chapter 6) contains a classification of varieties, especially of dimension three, which admit continuous groups of transformations; the sections dealing with pseudo-abelian and para-abelian varieties, as well as some portions of the second part of the book, had previously appeared only in original papers by the same author. A 15-page appendix gives a condensed list of results on surfaces, with which the reader is assumed to be more or less familiar.

Actually, it seems to the reviewer that the reader should be quite familiar with the whole body of algebraic geometry, before he can attempt reading this work with understanding and profit; for a reader of this type, Chapters 1 to 3 could then have been omitted, or relegated to the appendix, thus making room for a more detailed